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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	: **10/699,948**
Applicant	: **John W. Bucknell**
Filed	: **November 3, 2003**
	(continuation of USSN 09/914346, filed 08/27/2001)
Title	: **Tensioning Hydraulic Nuts**
TC/A.U.	: **3677**
Examiner	: **Sharp, Jeffrey Andrew**
Docket No.	: **57104 Cont**

CERTIFICATE OF MAILING

Commissioner for Patents
P. O. Box 1450
Alexandria, Virginia 22313-1450

S I R:

I, Christine A. Lambert, hereby certify that the attached documents hereto: **Original, executed, Declaration Pursuant to 37 CFR 1.132** along with a first-class postage prepaid return receipt card, are being deposited today, **August 5, 2005** with the United States Postal Service with sufficient postage as first-class mail in an envelope addressed to:

Commissioner for Patents
P. O. Box 1450
Alexandria, Virginia 22313-1450

Christine Lambert
Christine A. Lambert

August 5, 2005
Date

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	**10/699148**
Applicant	:	**John Wentworth BUCKNELL**
Filed	:	**November 3, 2003**
Title	:	**TENSIONING HYDRAULIC NUTS**
TC/A.U.	:	**3677**
Examiner	:	**Jeffrey Sharp**
Docket No.	:	**57104 CONT**

DECLARATION PURSUANT TO 37 CFR 1.132

Mail Stop: AMENDMENT
Commissioner for Patents
P. O. Box 1450
Alexandria, Virginia 22313-1450

S I R:

Submitted herewith for consideration by the examiner is the Declaration of John Wentworth Bucknell, pursuant to 37 CFR 1.132.

Respectfully submitted,
Dennis H. Lambert & Associates

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Reg. No. 25,017

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:	
JOHN WENTWORTH BUCKNELL	
Serial No. 10/699,948	Examiner: Jeffrey A. Sharp
Filing Date: November 3, 2003	Art Unit: 3677
For: **TENSIONING HYDRAULIC NUTS**	

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

DECLARATION UNDER 37 C.F.R. 1.132
OF JOHN WENTWORTH BUCKNELL

1. As a qualified Mechanical Engineer with an extensive trade and manufacturing background, I have been directly involved with hydraulic technologies since commencing my working career in 1974. After designing Hydraulic Tensioning Apparatus for the agricultural industry in 1984, I then applied this knowledge to other industries, resulting in designs and equipment which I registered for International Patents thereafter. I founded a business for commercial exploitation of these technologies, and commenced manufacturing in 1988. This business is active and growing to this day, and retains a strong Research and Development aspect. My efforts have been supported by a number of Australian Government Grants and assistance packages which recognize the unique status of my company's products.

I have been personally responsible for a large number of development projects aimed to produce specialized fastener systems for industries such as mining, steelmaking, shipbuilding, and power generation. Typically in these industries, the fasteners are operating under high tensile loads and/or at high temperatures, and failure

results in expensive downtime, and can have catastrophic consequences (eg., resulting in the leakage of radioactive coolant in nuclear power installation). I have successfully applied for US Patents #5730569, #5046906, #6494465, and their international counterparts, and have a number of other Patent Applications in process, including that of #10/699948 which is the subject of this affidavit.

2. During my career, I have had extensive exposure to the unique needs of certain industries to effectively and safely apply tensile loads to large bolts. The invention of Patent Application #10/699948 pertains particularly to the tensioning of large bolts used for the fastening of steam turbine half-joints. In such cases, there is no provision for fitting standard types of hydraulic bolt tensioners as the bolts have insufficient length to engage a stud puller and there is no face area upon which to locate the tensioner's bridge. All components must therefore fit within the confines of the spotface dimension which normally allows only for the standard nut to be used. Even if there were sufficient room to place the tensioner bridge, then the entire bolt array would need to be replaced with longer studs to accommodate the puller engagement required. The commonly used nut/bolt thread interface does not allow dissipation of thread loads, and therefore these loads are concentrated upon the first threads of engagement, leading to overstressing of material in the root area of the threads and contributing to early failure of the bolt.

3. The invention overcomes these limitations by providing a fastening system which fits wholly within standard spotface dimensions, does not require bolt replacement, and is able to evenly distribute thread load concentrations for longer bolt service life. The preferred apparatus described in #10/699948 incorporates a number of innovative features to permit such function.

4. The Cone Nut assembly is unique in its design and function, and is constructed in a manner to enable transmission of residual bolt force occasioned by the tensioning across the entire thread profile. It does so by permitting the thinner lower sections to progressively expand under the influence of the radial force vector developed by the thread interface, thus allowing stresses to be dissipated and evenly loading the interface. The radial expansion is limited by the taper of the Cone Outer, which has a slightly different included angle to the Cone Nut Inner component. It is this mechanism which permits and controls thread load distribution across the interface. The components lock in friction, which retains the induced elongation and consequential bolt load. When combined with the HydraJac Tensioner, it is the only possible means of locating an hydraulic bolt tensioner wholly within the dimensions of the spotface

provided on the aforesaid turbine casings. The HydraJac bridge stands directly upon the outer sleeve, and applies force to the joint face through the component, allowing for an even spread of compressive load across the spotface. No other tensioner system does this.

5. The conical buttress thread is unique in form and function. It is the only construction which can transmit the extreme forces required for tensioning in the short length of engagement available in the bolt protrusion above the joint face commonly found in steam and gas turbine half-joints. It is designed to spread the thread load equally across all threads of the interface during the tensioning phase.

6. Clearly, it has been a long process to optimize the performance of this invention. These results are the outcome of a combination of expertise, computer modeling and machining accuracy which is absolutely unique. Without modern digital technologies it would not be possible to design and manufacture components which exhibit these functions. I would respectfully submit that these are not a casual arrangement of other's technologies, but a truly innovative solution to intensely practical industry problems. My company has already successfully installed fasteners using this technology on one nuclear-powered steam turbine, supplied further sets for forthcoming installations, and received further forward orders for these systems.

7. These hydraulically tensioned fasteners, and the tensioning method employing the HydraJac bridge, have been adopted worldwide, including in the U.S.A. and Japan.

8. I hereby declare that all statements made herein of my own accord are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title XVIII of the United States Code, that any such willful false statements may jeopardize the validity of the application or any patent issued thereon.

JOHN WENTWORTH BUCKNELL

DATED this 18th day of JULY, 2005